CLAIMS:

What is claimed is:

1. A method for extracting a plurality of analytes from a sample, comprising:

providing at least 100 differentiable extraction probes capable of adsorbing analytes, each differentiable extraction probe comprising a solid support and a different extraction phase;

contacting said differentiable extraction probes with a sample suspected of comprising at least one of said analytes;

separating said differentiable extraction probes from said sample; and

distinguishing among said differentiable extraction probes.

2. The method of claim 1, wherein said differentiable extraction probes are encoded and distinguished in dependence on said encoding.

3. The method of claim 2, wherein said solid supports are encoded.

4. The method of claim 1, wherein at least 150 differentiable extraction probes are provided.

5. The method of claim 1, wherein at least 200 differentiable extraction probes are provided.

6. The method of claim 1, wherein at least 500 differentiable extraction probes are provided.

7. The method of claim 1, wherein at least 1000 differentiable extraction probes are provided.

8. The method of claim 1, wherein at least 10,000 differentiable extraction probes are provided.

9. The method of claim 1, wherein said extraction probes are contacted with said sample simultaneously.

10. A method for extracting a plurality of analytes from a sample, comprising:

providing a plurality of different extraction probes capable of adsorbing analytes, each different extraction probe comprising a nanoparticle and a different extraction phase;

contacting said extraction probes with a sample suspected of comprising at least one of said analytes; and

separating said extraction probes from said sample.

11. The method of claim 10, wherein said nanoparticles are segmented nanoparticles.

12. The method of claim 10 wherein said extraction probes are differentiable, and wherein said method further comprises distinguishing between at least two different separated extraction probes.

13. The method of claim 12 wherein said extraction probes are encoded, and wherein said separated extraction probes are distinguished in dependence on said encoding.

14. The method of claim 12 wherein said separated extraction probes are distinguished by an optical method.

15. The method of claim 14 wherein said separated extraction probes are distinguished by a method selected from the group consisting of absorbance, fluorescence, Raman, hyperRaman, Rayleigh scattering, hyperRayleigh scattering, CARS, sum frequency generation, degenerate four wave mixing, forward light scattering, back scattering, and angular light scattering.

16. The method of claim 12 wherein said separated extraction probes are distinguished by a method selected from the group consisting of near field scanning optical microscopy, atomic force microscopy, scanning tunneling microscopy, chemical force microscopy, lateral force microscopy, transmission electron microscopy, scanning electron microscopy, field emission scanning electron microscopy, electrical methods, mechanical methods, magnetic detection methods, and SQUID.

17. The method of claim 10 further comprising detecting at least one analyte associated with said separated extraction probes.

18. The method of claim 17 wherein said detecting step comprises quantifying said associated analyte.

19. The method of claim 17 wherein said detecting step comprises identifying said associated analyte.

20. The method of claim 10 wherein said extraction phase is selected from the group consisting of hydrophobic materials, hydrophilic materials, acids, bases, polyclonal antibodies, monoclonal antibodies, aptamers, small molecule receptors, polymers, molecular solids, non-molecular solids, metals, metal ions, cations, and anions.

21. The method of claim 10 wherein at least one of said extraction phases is selected from the group consisting of a protein, peptide, and nucleic acid, and wherein said at least one extraction phase interacts with an analyte selected from the group consisting of a protein, peptide, and nucleic acid.

22. The method of claim 10, wherein providing a plurality of different extraction probes comprises providing at least 10 different extraction probes.

23. The method of claim 22, wherein providing a plurality of different extraction probes comprises providing at least 100 different extraction probes.

24. The method of claim 23, wherein providing a plurality of different extraction probes comprises providing at least 1000 different extraction probes.

25. The method of claim 24, wherein providing a plurality of different extraction probes comprises providing at least 10,000 different extraction probes.

26. The method of claim 10, wherein said extraction probes are contacted with said sample simultaneously.

27. A method for extracting a plurality of analytes from a sample, comprising:
providing a plurality of differentiable extraction probes of different masses, each comprising a solid support and a different extraction phase and being capable of adsorbing an analyte;
contacting said extraction probes with a sample suspected of comprising at least one of said analytes;
separating said extraction probes from said sample; and
distinguishing among said differentiable extraction probes in dependence on said masses.

28. A method for extracting a plurality of analytes from a sample, comprising:
providing a plurality of different extraction probes encoded with spatially-resolvable codes, each extraction probe comprising a solid support and a different extraction phase and being capable of adsorbing an analyte;
contacting said extraction probes with a sample suspected of comprising at least one of said analytes;
separating said extraction probes from said sample; and
distinguishing among said different extraction probes in dependence on said spatially-resolvable codes.

29. The method of claim 28, wherein said codes are distinguished optically.

30. The method of claim 28, wherein said codes comprise spatially-resolvable reflectivities.

31. A method for extracting a plurality of analytes from a sample, comprising:
providing a position-addressable array of extraction probes, each comprising a solid support and a different extraction phase;
providing an array of capillary tubes addressable by said array of extraction probes, said capillary tubes containing sample aliquots;

contacting said array of extraction probes with said array of capillary tubes such that said extraction probes are positioned within said capillary tubes; and

separating said array of extraction probes from said array of capillary tubes.

32. The method of claim 31 wherein each extraction probe comprises a different extraction phase.

33. The method of claim 31 wherein each sample aliquot is different.

34. A method for extracting a plurality of analytes from a sample, comprising:

providing a position-addressable array of extraction probes, each comprising a fiber and an extraction phase, wherein each extraction probe is capable of adsorbing an analyte;

contacting said array of extraction probes with sample aliquots suspected of comprising at least one of said analytes; and

separating said array of extraction probes from said sample aliquots.

35. The method of claim 34 wherein each extraction probe comprises a different extraction phase.

36. The method of claim 34 wherein each sample aliquot is different.

37. The method of claim 34 wherein each fiber has a diameter of less than 100 microns.

38. The method of claim 37 wherein each fiber has a diameter of less than 1 micron.

39. A method for detecting analytes that are differentially present in a first sample and a second sample, said method comprising:

providing first and second sets of extraction probes capable of adsorbing different analytes, each extraction probe comprising a solid support and an extraction phase, wherein said first set and said second set contain a substantially equal distribution of different extraction probes;

contacting said first set of extraction probes with said first sample and said second set of extraction probes with said second sample;

separating said first set of extraction probes from said first sample and said second set of extraction probes from said second sample;

detecting a first analyte set associated with said first set of extraction probes and a second analyte set associated with said second set of extraction probes; and

comparing said first analyte set and said second analyte set.

40. The method of claim 39 further comprising identifying differences between said first analyte set and said second analyte set in dependence on said comparison.

41. The method of claim 39 wherein said first analyte set comprises at least ten analytes.

42. The method of claim 41 wherein said first analyte set comprises at least 100 analytes.

43. A method for detecting analyte isoforms in a sample, comprising:

providing a plurality of differently coded extraction probes, each comprising a solid support and a different extraction phase, wherein at least one of said extraction probes is capable of adsorbing a parent analyte and an isoform of said parent analyte;

contacting said extraction probes with a sample suspected of comprising said parent analyte and said isoform;

separating said extraction probes from said sample; and

detecting said parent analyte and said isoform in said separated extraction probes, wherein said parent analyte and said isoform are associated with extraction probes having the same code.

44. The method of claim 43, wherein said parent analyte is a parent protein and said isoform is a corresponding post-translationally modified protein.

45. The method of claim 43, wherein said extraction phase comprises a polyclonal antibody.

46. The method of claim 43, further comprising identifying said parent analyte and said isoform associated with said extraction probes.

47. The method of claim 46, wherein said parent analyte and said isoform are identified by mass spectrometry.

48. The method of claim 43, further comprising quantifying said parent analyte and said isoform associated with said extraction probes.

49. A method for designing analyte extraction probes, comprising:

providing a plurality of different extraction probes, each comprising a solid support and a different combinatorially-derived extraction phase, wherein each extraction probe is capable of adsorbing an analyte;

contacting said extraction probes with a sample suspected of comprising at least one of said analytes;

separating said extraction probes from said sample; and

identifying separated extraction probes that satisfy at least one predetermined extraction probe criterion.

50. The method of claim 49 wherein said extraction probe criterion comprises extracting at least one analyte of interest from said sample.

51. The method of claim 49 wherein said extraction probe criterion comprises extracting non-overlapping classes of analytes from said sample.

52. The method of claim 49 wherein providing a plurality of different extraction probes comprises providing between 4 and 100,000 different extraction probes.

53. The method of claim 52 wherein providing a plurality of different extraction probes comprises providing between 10 and 1000 different extraction probes.

54. The method of claim 49 wherein identifying said separated extraction probes comprises identifying between 10 and 50 separated extraction probes.

55. A method for extracting a plurality of analytes from a sample, comprising:
providing a plurality of different extraction probes capable of adsorbing analytes, each extraction probe comprising a solid support and a different combinatorially-derived extraction phase;
contacting said extraction probes with a sample suspected of comprising at least one of said analytes; and
separating said extraction probes from said sample.

56. The method of claim 55 wherein extraction phases of different extraction probes have different analyte specificities.

57. The method of claim 55 wherein at least one of said extraction phases has an affinity for one particular analyte.

58. The method of claim 55 wherein at least one of said extraction phases has an affinity for more than one particular analyte.

59. The method of claim 55 wherein at least one of said extraction phases comprises a polymer.

60. The method of claim 55 wherein at least one of said extraction phases comprises a self-assembled monolayer.

61. The method of claim 55 wherein said extraction phases comprise at least one material selected from the group consisting of a metal alloy, oxide, glass, ceramic, semiconductor, nucleic acid, oligonucleotide, carbohydrate, polysaccharide, peptide, protein, lipid, zeolite, and polyelectrolyte multilayer.

62. The method of claim 55 wherein said extraction phases are generated randomly.

63. The method of claim 55 wherein said extraction phases are selected from a combinatorial library.

64. The method of claim 55 further comprising detecting at least one analyte associated with said separated extraction probe.

65. The method of claim 64 wherein detecting said associated analyte comprises identifying said associated analyte.

66. The method of claim 65 wherein said associated analyte is identified using mass spectrometry.

67. The method of claim 64 wherein detecting said associated analyte comprises quantifying said associated analyte.

68. The method of claim 55 wherein providing a plurality of different extraction probes comprises providing between 4 and 100,000 different extraction probes.

69. The method of claim 68 wherein providing a plurality of different extraction probes comprises providing between 10 and 1000 different extraction probes.

70. The method of claim 55, wherein said extraction probes are contacted with said sample simultaneously.

71. The method of claim 55 wherein said solid support is a nanoparticle.

72. The method of claim 71 wherein said nanoparticle is a bead.

73. The method of claim 71 wherein said nanoparticle is an encoded nanoparticle.

74. The method of claim 73 wherein said encoded nanoparticle is a segmented nanoparticle.

75. The method of claim 55 wherein said solid support is a fiber.

76. A kit comprising at least 100 differentiable extraction probes capable of adsorbing analytes, each differentiable extraction probe comprising a solid support and a different extraction phase.

77. The kit of claim 76 wherein said solid supports are nanoparticles.

78. The kit of claim 77 wherein said solid supports are segmented nanoparticles.

79. The kit of claim 72 wherein said solid supports are fibers.

80. The kit of claim 72 wherein said extraction phases are combinatorially derived.

81. The kit of claim 72 wherein at least one of said extraction phases is a polymer.

82. The kit of claim 72 wherein at least one of said extraction phases is an antibody.

83. The kit of claim 72 wherein at least one of said extraction phases comprises a material selected from the group consisting of hydrophobic materials, hydrophilic materials, acids, bases, polyclonal antibodies, monoclonal antibodies, aptamers, small molecule receptors, polymers, molecular solids, non-molecular solids, metals, metal ions, cations, and anions.

84. The kit of claim 72 wherein at least one of said extraction phases comprises a material selected from the group consisting of a metal alloy, oxide, glass, ceramic, semiconductor, nucleic acid, oligonucleotide, carbohydrate, polysaccharide, peptide, protein, lipid, zeolite, and polyelectrolyte multilayer.

85. The kit of claim 72 wherein at least one of said extraction phases is a protein.

86. The kit of claim 72 wherein at least one of said extraction phases is a self-assembled monolayer.

87. The kit of claim 72 wherein said extraction probes are encoded.

88. The kit of claim 87 wherein said extraction probes are encoded by spatially-resolvable codes.